Interim Report

ORSER-SSEL Technical Report 22-73

CORRECTION OF BANDING IN MSS DIGITAL DATA

F. Y. Borden

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INTERDISCIPLINARY APPLICATION AND INTERPRETATION OF ERTS DATA WITHIN THE SUSQUEHANNA RIVER BASIN

Resource Inventory, Land Use, and Pollution

Office for Remote Sensing of Earth Resources (ORSER)
Space Science and Engineering Laboratory (SSEL)
Room 219 Electrical Engineering West
The Pennsylvania State University
University Park, Pennsylvania 16802

Principal Investigators:

Dr. George J. McMurtry
Dr. Gary W. Petersen

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In the ERTS-1 instrument configuration, six banks of the four channel sensors record data for six scan lines simultaneously. MSS digital data have been received in which data for some sensors have been nonconformable with data from the rest of the sensors. The effect was first recognized by banding with a modulo of six in computer output maps. To investigate the problem, the NMAP program[1] was extended to compute the mean and variance for each channel for each line modulo six. It was apparent that the problem had to do with calibration or processing of the data by NASA. It was also apparent that the data could be recalibrated, at least in an approximate way, by use of the MSS data alone.

Output from the NMAP program indicates which sensors in which of the six banks of sensors are involved. The SUBSET program has been extended to allow input of recalibration parameters for the offending sensor data. The following correction is then applied:

$$\hat{X}_{ijk} = [(X_{ijk} - \overline{X}_{k\ell}] * s'_{k\ell} + \overline{X}'_{k\ell}$$

where

$\hat{X}_{ijk}$ is the recalibrated value for scan line i, element j, and channel k;

X_{ijk} is the corresponding original value;

$\overline{X}_{k\ell}$ is the computed mean for channel k and for line ℓ = modulo (j, 6) + 1 taken from NMAP output;

$s_{k\ell}$ is the corresponding standard deviation;

$s'_{k\ell}$ is the recalibration standard deviation computed as the average of unaffected standard deviations for channel k based on NMAP output; and

$\overline{X}'_{k\ell}$ is the corresponding recalibration mean.

This correction has eliminated the banding problem in all data to which it has been applied.

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[1] See ORSER-SSEL Technical Report 10-73 for the program description.